Dr. Harjot Kaur

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Current Address: # 12792-002, Z-7, Main Multania Road, Bathinda, Punjab (IN)-151001

Languages known: English, Hindi, Punjabi

Education:

- Ph.D. in Experimental High Energy Physics, Panjab University (IN), (2024)
  - **Dissertation Title:** "Search for supersymmetry with VBF tagging in the single lepton final state at √s = 13 TeV using the CMS detector at LHC"
  - **Advisors:** Prof. Vipin Bhatnagar and Dr. Nitish Dhingra
- M.Sc. (Hons.) Physics, Panjab University (IN), 2017.
- B.Sc. (Hons.) Physics, Panjab University (IN), 2015.

National Level Exams:

- CSIR NET-JRF, 2017 AIR: 22
- JEST, 2018 AIR: 53
- GATE(Physics), 2018 AIR: 83
- BARC, 2018 Qualified
- GATE (Physics), 2024 AIR: 375

Work Experience

- MRSPTU, Bathinda, Punjab (IN) (*Lecture basis*)
  August 2024 – present
- Govt. Rajindra College, Bathinda, Punjab (IN) (*Lecture basis*)
  March 2024 – May 2024
- Department of Physics, Panjab University, Chandigarh (*Teaching Assesments*)
  Jan 2019 – Feb 2023

Positions:

- Research Associate, IISER Mohali, October 2023 – February 2024
- Senior Research Fellow (SRF), CSIR, 2020-2023
- Junior Research Fellow (JRF), CSIR, 2018-2020

Area of Research Work:

- Experimental High Energy Physics
- Instrumentation

International workshops/schools/ conferences attended:

- 31st International Symposium on Lepton Photon Interactions at High Energies, 17-21 July, 2023, Melbourne, Australia.
- 2022 Asia-Europe-Pacific School of High-Energy Physics, 5-18 October, 2022, Pyeongchang, South Korea.
- Fermilab-CERN Hadron Collider Physics Summer School (HCPSS), 10-21 August, 2020.
- CMS GEM Workshop, October 01, 2019, CERN, Switzerland.

Presentations/poster presented in the conferences/meetings:

- Upgradation of muon system of CMS Detector with triple-GEM Detector

  67th DAE BRNS Symposium on nuclear physics, December 09-13, 2023, IIT Indore, Madhya Pradesh, India.

- Searches for SUSY particles (electroweakinos, top squarks and sleptons) from CMS

  31st International Symposium on Lepton Photon Interactions at High Energies, 17-21 July, 2023, Melbourne, Australia.

- SUSY Searches via VBF in 1-lepton final states using LHC Run 2 data collected by the CMS detector

  2022 Asia-Europe-Pacific School of High-Energy Physics, October 15-18, 2022, Pyeongchang, South Korea.

- Search for Supersymmetry with VBF tagging using Run II data collected by CMS detector at the LHC

  15th Chandigarh Science Congress, September 15-197 2022, Panjab University, Chandigarh, India.

- Probing new particles in proton-proton collisions with CMS Detector at the LHC

  65th DAE BRNS Symposium on nuclear physics, December 1-5, 2021, Mumbai, Maharashtra, India.

- Upgradation of CMS Detector at the LHC with GEM Detector

  Advanced Radiation Detector and Instrumentation in Nuclear and Particle Physics (RAPID2021), October 25-29, 2021, Jammu, India.

- SUSY searches with VBF topology in single lepton final states in the CMS experiment

14th Chandigarh Science Congress, December 17-19, 2020, Panjab University, Chandigarh, India.

- Search for Compressed Mass Spectrum SUSY via Electroweak VBF in Single Lepton Final States Using LHC Run II Data Collected with CMS Detector at √s=13 TeV

  24th DAE-BRNS High Energy Physics Symposium, December 14-18, 2020, NISER, Odisha, India.

- Update on GEM – Panjab

  CMS GEM Workshop, October 01, 2019, CERN, Switzerland.

Publications:

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh. “Upgradation of muon system of CMS Detector with triple-GEM Detector.” *DAE Symp.Nucl.Phys.* 67, 1267-1268, 2024.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh. “Searches for electroweak SUSY and compressed SUSY spectra from CMS” CMS-CR-2023-149, 2023. https://doi.org/10.5281/zenodo.8347241.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh *et al*. “Upgradation of CMS Detector at the LHC with GEM Detector”. *Springer Proc. Phys.*, 282:75–81, 2023. doi: 10.1007/978-3-031-19268-5 10.

- Harjot Kaur. “Search for Compressed Mass Spectrum SUSY via Electroweak VBF in Single Lepton Final States Using LHC Run II Data Collected with CMS Detector at √s = 13 TeV.”. *Springer Proc. Phys.*, 77:121–125, 2022. doi: 10.1007/978-981-19-2354-8 22.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh. “Probing new particles in proton-proton collisions with CMS Detector at the LHC”. In *65th DAE BRNS Symposium on nuclear physics, 2022*.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh *et al*. “Quality control of mass-produced GEM detectors for the CMS GE1/1 muon upgrade". *Nucl. Instrum. Meth. A*, 1034:166716, 2022. doi: 10.1016/j.nima.2022.166716.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh *et al*. “Performance of a triple-GEM demonstrator in pp collisions at the CMS detector”. *JINST*, 16(11):P11014, 2021. doi: 10.1088/1748-0221/16/11/P11014

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh *et al*. “Fabrication and Characterization of Gaseous Detector for the identification of High Energy Particles”. *IOP Conf. Ser. Mater. Sci. Eng.*, 1033(1):012055, 2021. doi: 10.1088/1757-899X/1033/1/012055.

- Harjot Kaur, Vipin Bhatnagar, Nitish Dhingra, J.B. Singh *et al*. “Detector Control System for the GE1/1 slice test”. *JINST,* 15(05):P05023, 2020. doi: 10.1088/1748-0221/15/05/P05023.

Publications as co-author with CMS Collaboration:

- CMS Collaboration. “Search for supersymmetry in final states with disappearing tracks in proton-proton collisions at $\sqrt{s}$ = 13 TeV” eprint: 2309.16823, 2023. CERN-EP-2023-209

- Development of the CMS detector for the CERN LHC Run 3.” eprint: 2309.05466. CERN-EP-2023-136.

- "Search for new physics in multijet events with at least one photon and large missing transverse momentum in proton-proton collisions at 13 TeV.” *JHEP* 10 (046), 2023. doi:10.1007/JHEP10(2023)046.

- “Search for top squark pair production in a final state with at least one hadronically decaying tau lepton in proton-proton collisions at √s= 13 TeV." *JHEP* 07(110), 2023. doi:10.1007/JHEP07(2023)110.

- CMS Collaboration. “A portrait of the Higgs boson by the CMS experiment ten years after the discovery”. *Nature*, 607(7917):60–68, 2022. doi: 10.1038/s41586-022-04892-x.
- CMS Collaboration. “Measurement of the Drell-Yan forward-backward asymmetry at high dilepton masses in proton-proton collisions at √s = 13 TeV”. *JHEP*, 2022(08):063, 2022. doi: 10.1007/JHEP08(2022)063.
- CMS Collaboration. “Inclusive nonresonant multilepton probes of new phenomena at √s=13 TeV”. *Phys. Rev. D*, 105(11):112007, 2022. doi: 10.1103/PhysRevD.105.112007.
- CMS Collaboration. “Measurement of the Higgs boson width and evidence of its off-shell contributions to ZZ production”. *Nature Phys*., 18(11):1329–1334, 2022. doi: 10.1038/s41567-022-01682-0.
- CMS Collaboration. “Measurement of the Higgs boson width and evidence of its off-shell contributions to ZZ production”. *Nature Phys.*, 18(11):1329–1334, 2022. doi: 10.1038/s41567-022-01682-0.
- CMS Collaboration. “Search for invisible decays of the Higgs boson produced via vector boson fusion in proton-proton collisions at √s=13 TeV”. *Phys. Rev. D*, 105(9):092007, 2022. doi: 10.1103/PhysRevD.105.092007.
- CMS Collaboration. “Observation of $B^0 \rightarrow \Psi(2S)\ K_S^0\ \pi^+\ \pi^-$ and $B_S^0 \rightarrow \Psi(2S)\ K_S^0$ decays”. *Eur. Phys. J. C*, 82:499, 2022. doi: 10.1140/epjc/s10052-022-10315-y.

- CMS Collaboration. “Measurement of the inclusive and differential $\mathrm{t\bar{t}}\gamma$ cross sections in the dilepton channel and effective field theory interpretation in proton-proton collisions at √s=13 TeV”. *JHEP*, 05:091, 2022. doi: 10.1007/JHE P05(2022)091.
- CMS Collaboration. “Search for resonances decaying to three W bosons in the hadronic final state in proton-proton collisions at √s=13 TeV”. *Phys. Rev. D*, 106(1):012002, 2022. doi: 10.1103/PhysRevD.106.012002.
- CMS Collaboration. “Search for resonant production of strongly coupled dark matter in proton-proton collisions at 13 TeV”. *JHEP*, 06:156, 2022. doi: 10.1007/JHEP06(2022)156.
- CMS Collaboration. “Benchmarking LHC background particle simulation with the CMS triple-GEM detector”. *JINST*, 16(12):P12026, 2021. doi: 10.1088/1748-0221/16/12/P12026.
- CMS Muon Group. “Triple-GEM discharge probability studies at CHARM: simulations and experimental results”. *JINST*, 5(10):P10013, 2020. doi: 10.1088 /1748-0221/15/10/P10013.
- CMS Muon Group. “Interstrip capacitances of the readout board used in large triple-GEM detectors for the CMS Muon Upgrade”. *JINST*, 15(12):P12019, 2020. doi: 10.1088/1748-0221/15/12/P12019.
- CMS Muon Group. “Two years' test of a temperature sensing system based on fibre Bragg grating technology for the CMS GE1/1 detectors”. *J. Phys. Conf. Ser.*, 1561(1):012006, 2020. doi: 10.1088/1742-6596/1561/1/012006.
- CMS Muon Collaboration. “Performance of prototype GE1/1 chambers for the CMS muon spectrometer upgrade”. *Nucl. Instrum. Meth. A*, 972:164104, 2020. doi: 10.1016/j.nima.2020.164104.

All publications as co-author with CMS Collaboration here

Skills:

- Computation: FORTRAN, C++, Python, Latex, MS word, excel, PPT, Machine Learning and AI tools.
- All the necessary software tools for high energy physics analysis (CMSSW, ROOT).
- Experience in collaborative research work.
- Excellent organizational and time management skills.
- Excellent written and verbal communication skills.